ELECTRONICS

KIT FOR THE STUDY OF PHOTOVOLTAIC SOLAR ENERGY

DL 3155BRS-PSE

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.

The kit is a complete configuration for photovoltaic energy study in an off grid system. Its covers the fundamentals of solar cell and its operation in a storage system mode.

NOTE WELL! The board comes with a case complete with all accessories.

LEARNING EXPERIENCES

- Electrical characteristics of a single solar cell
- Electrical characteristics of two solar cells connected in series
- Electrical characteristics of two solar cells connected in parallel
- Electrical characteristics of a solar panel
- Monitoring of the charge level and analysis of the discharging process in a gel battery
- Charging a battery by using a current regulator
- Charging a battery by using a charge regulator
- Analysis and comparison of two light sources
- Smart energy management system
- Study of energetic efficiency by means of a breadboard.

CIRCUIT BLOCKS

- Base board
- Solar cell mini board x2
- Battery charge regulator mini board
- Double voltmeter mini board
- Voltage regulators mini board
- Battery level monitor mini board
- Light Tester mini board Kit
- Current driver and relay mini board
- Bread Board mini board
- Battery module (12V)
- Solar panel module 5W
- Fan module (load)

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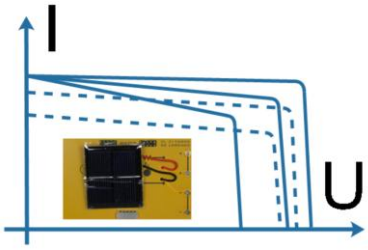
ACCESSORY INCLUDED:
DL 2555ALG - DC POWER SUPPLY

- ± 5 Vdc, 1 A
- ±15 Vdc, 1 A

Complete with manual (theoretical and practical) and cable kit.
Dimensions of the board: 297x260mm

EXPERIMENTS DESCRIPTION

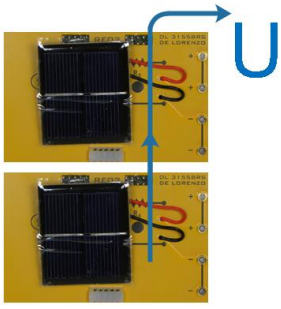


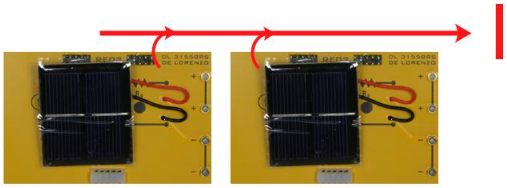
Electrical characteristics of a single solar cell

With a simple, small, and cheap solar cell you can prove the concept and draw the complex I-U characteristics, including the temperature influence on it.

Electrical characteristics of two solar cells connected in series

In real life we need some time higher voltage than one single panel can provide. In simple words, by adding two cells in series we obtain higher output voltage.
Through simple experiments we get conclusions about how cells are working in different conditions.





Electrical characteristics of two solar cells connected in parallel

Parallel connection of two power supplies offer higher current capabilities. In this experiment we test the working conditions of this connection between solar cells

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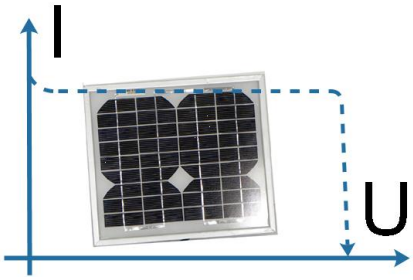
Electrical characteristics of a solar panel

When we have many cells, and, after we understood what effects we obtain when we are connecting them in series and parallel, we can try to see how they are working together. A commercial solar pannel offers the possibility to expand the studies for higher amount of captured energy.

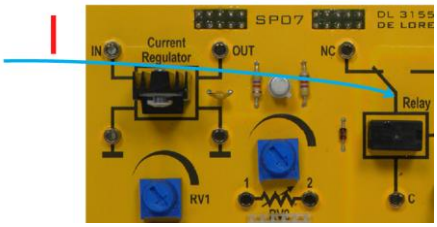


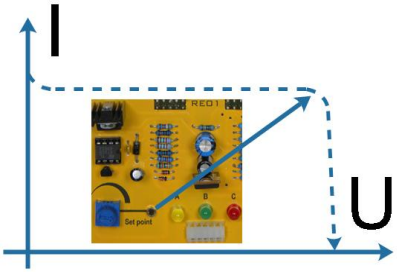
Monitoring of the charge level and analysis of the discharging process in a gel battery

Storing captured energy during a sunny day and using it in the night is a necessity of every energy user. In this experiment we learn the use of an accumulator to store the energy.

Charging a battery by using a current regulator

The charge of an accumulator is not a simple procedure, the solar panel and the battery are influencing each other. The solution consists in a current regulator.





Charging a battery by using a charge regulator

I-U characteristic of the solar panel needs control for maximum power injection into the accumulator. In the same time we must control the level of voltage in accumulator to avoid over charging.

Analysis and comparison of two light sources

After learning system connections, energy storage, we now learn how we can use energy in our daily lives. Through the use of lights as loads we learn how to use our system, through the system or directly from the energy source

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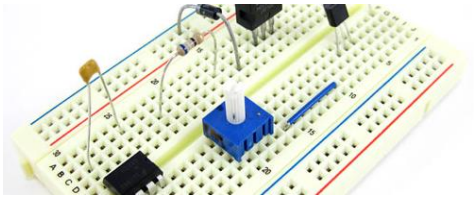
Smart system for energy management

A system is considered smart if it reacts according with our expectations, for instance the availability and the behaviours of the light during needed time. It is smart if we design it smart. We design it smart if we know its behaviour very well.
Through this study we understand “the limits” of its smartness through the exploitation of the energy consumption in local lighting, taking into account its effectiveness and time of use, taking into account the balance between produced and consumed solar energy.

Study of energetic efficiency by means of a breadboard

With the many ideas accumulated during the previous experiments, the student has ability and possibility to create circuits, networks and other tests for the solar system. Through a transistor in EC connection and two resistors, the student can design a simple light dimmer.



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